Scaleup of Versatile, Fully Automated, Microfluidic Cell Culture System

Grant Award Details

Scaleup of Versatile, Fully Automated, Microfluidic Cell Culture System

Grant Type: Tools and Technologies I

Grant Number: RT1-01024

Investigator:

Name:	Marc Unger
Institution:	Fluidigm Corporation
Type:	PI

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $749,518

Status: Closed

Progress Reports

Reporting Period: Year 1

View Report

Reporting Period: Year 2

View Report

Grant Application Details

Application Title: Scaleup of Versatile, Fully Automated, Microfluidic Cell Culture System

Public Abstract:

We are proposing to optimize and scale up a highly advanced (microfluidic) cell culture system into manufacturable form. This system will allow researchers to:

Identify stem cell culture and differentiation conditions
Identify genes and small molecules effecting stem cell self-renewal and differentiation, and
Identify genes and small molecules involving or effecting reprogramming of differentiated cells.

...much more rapidly and efficiently than they have been able to in the past.

Reprogramming a patient's own differentiated cells (e.g. skin cells) into stem cells overcomes the ethical and immunological barriers to theraputic usage which are present with the use of embryonic stem cells. These stem cells can be used in cell based therapy, tissue or organ repair, and potentially even organ reconstruction. Understanding what controls stem cells to differentiate into a desired type of cell helps directly in the development of theraputic applications. Thus, this tool will help both to determine conditions to convert differentiated cells into stem cells, and to develop therapies using the resulting stem cells.

Statement of Benefit to California:

The system proposed here will allow us to

Identify stem cell culture and differentiation conditions
Identify genes and small molecules effecting stem cell self-renewal and differentiation, and
Identify genes and small molecules involving or effecting reprogramming differentiated cells.

These capabilities will accelerate stem cell research in California. Since the grant will support work done in South San Francisco and San Diego, and the end result may be the creation of a commercial product, there is a direct economic multiplier effect for the resources invested.

More importantly, the identification of conditions which enable the reprogramming of differentiated cells will enable new therapies. Patient specific pluripotent stem cells can be used in cell based therapy, tissue or organ repair, and even organ reconstruction. The availability of powerful tools in California will help ensure that these new therapies are pioneered in California, leading both to job creation and the availability of the most advanced medical care in the world for California citizens.
